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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/767,167

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Akira Miura

042054

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38834

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07/21/2009

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EXAMINER

REAMES, MATTHEW L

ART UNIT

PAPER NUMBER

2893

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/767,167

**Applicant(s)**

MIURA ET AL.

**Examiner**

Matthew Reames

**Art Unit**

2893

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2 and 4-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-2, 5-6, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (5,247,223) in view of Taylor (6,410,941).
  - a. As to claim 1-2, and 11 and 11, Mori teaches a fine vacuum tube being used as an interference system (fig. 3) specifically the Aharonov-Bohm effect which uses the quantum effect of ballistic electrons. Mori further teaches a magnetic field in communication with the device (see column 6) thus the integrated circuit includes whatever is generating the magnetic-field unit allow the device of Mori to be fully functional. Further the Aharonov-Bohm is a interference and thus is an interference structure.

Mori does not explicitly teach the use of the device in an integrated circuit.

Taylor teaches integrating MOS transistors and semiconductor lasers (see e.g. figure 16-20) for communication purposes see (e.g. item 202) each of which are solid state devices.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the device of Mori in an integrated circuit such as that of Taylor.

One would have been so motivated in order to have formed an integrated circuit with a transistor capable of operating at high speed at room temperature (see e.g. column 5).

- b. As to claim 5, Taylor teaches a laser, an optical device (see e.g. figure 18 item 181) with the device of Mori being used it would inherently have a high response rate.
  - c. As to claim 6, Taylor teaches a photodetector (see e.g. column 20) which senses electro-magnetic wave and thus meets the limits of the claim. Further Mori device uses ballistically traveling electrons (electrons flowing through a vacuum)
2. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori/Taylor as applied to claim 1 above, and further in view of Eastman (3,636,399).
- a. As to claims 7-8, Mori teaches a cold cathode maybe used (see last sentence of column 6). Thus Mori teaches at least two types of electron emission devices. The cold cathode and the cathode taught through out the disclosure of Mori.

Mori/Taylor does not explicitly teach a thermionic cathode

Eastman teaches that that electrons can be emitted from a thermionic cathode using LaB6 (column 3).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a thermionic cathode using LaB6 as the emitter.

One would have been so motivated for the high current emission provided by LaB6 (column 3 of Eastman). Further the structure of Eastman and the structures of Mori are all electron emission devices and are thus functional equivalent methods/structures.

3. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori/Taylor as applied to claim 1 above, and further in view of Baseit (5,981,297).
  - a. As to claim 12 and 13, Mori/Taylor does not explicitly teach how the magnetic field is generated.

However Baseit teaches coils and current lines were widely known conventional method of creating magnetic fields (see e.g. claims 13 and 31).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have made the magnetic field generating unit as a coil or two current lines.

One would have been so motivated since it would reduce cost and enable the device to be integrated with existing technology.

4. Claims 1-2, 4, and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada (5,003,360) in view of Mori.

a. As to claims 1-2, and 4 Okada teaches using a semiconductor device using the Aharonov-Bohm effect, measuring the phase difference of a electron as it travels through a slit (see e.g. fig. 1 and figs. 4-9), can be used to form digital to analog converters by forming a plurality of such devices (see e.g. fig. 1 and description, fig. 4 and description and fig. 9 and description). Okada further teaches a semiconductor device. Okada further teaches the device is made from semiconductor material and is not a vacuum tube. Okada further teaches a magnetic field in communication with the device (see e.g. column 3). Thus the entire device (integrated circuit) can be interpreted as the device of Okada with magnetic field generation unit.

Mori teaches the fine vacuum tube used as an interference device (see e.g. fig. 3). Mori further teaches the transistor of Okada fig. 1 was known (see e.g. fig. 1 of Mori). Further Mori teaches the devices of Okada using a semiconductor material must be cooled to low temperature in order to operate (see e.g. background).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the A/D converter of Okada fig. 9 from the fine vacuum tubes devices of Mori.

One would have been so motivated in order to operate the device at room temperatures.

b. As to claims 9-10, it is unclear what a Mach-Zehnder interferometer for an electron is since the term is used for optical systems.

However Okada teaches the interferometer as claimed/suggested (see e.g. figs. 9). Therefore the Okada/Mori device will be understood to be a Mach Zehnder interferometer.

***Allowable Subject Matter***

5. Claim 14 is allowed.

The following is an examiner's statement of reasons for allowance: Prior art fails to teach a quartz window in communication with said fine (nano) vacuum tube, a photoelectric conversion element in communication with said quartz window in conjunction with other elements of claim 14.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

6. Applicant's arguments filed 4/1/2009 have been fully considered but they are not persuasive.
7. As to Applicant's argument Mori discloses a magnetic field in order for the device to work, thus whatever is generating the magnetic field should be consider part of the device to make a fully functional device.
8. As to figure 2 and 3, Mori recites:

FIG. 3 is a cross sectional view showing a structure of an AB effect transistor according to the embodiment of FIG. 2.

9. Thus figure 2 is a simple electronic schematic while figure 3 is the same device showing physical structure. Thus they are the same device thus whatever is disclosed in figure 2, should be understood to be applicable to figure 3. Since Mori teaches a magnetic field in figure 2, one rudimentary skill in the art would understand this is also a recitation on figure 3.

10. As to the Okada reference, Okada discloses a magnetic field in order for the device to work, thus whatever is generating the magnetic field should be consider part of the device to make a fully functional device.

Figure 1 of Okada is not an integrated circuit figure 1 show a single device, figure 4 of Okada is shown to the integration of multiple devices. Thus applicant's arguments are not commensurate with the scope of the rejection.

Applicant's arguments with respect to claims 5, 7, 8, 12 and 13 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

9. Applicant's amendment on 9/26/2008 necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within



TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Reames whose telephone number is (571) 272-2408. The examiner can normally be reached on M-Th 6:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on (571)272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MLR/

/Davienne Monbleau/  
Supervisory Patent Examiner, Art Unit 2893